

AND  
TEL. 2-0700

# OPERATING INSTRUCTIONS FOR MODEL TW-11 TUBE TESTER



MANUFACTURED BY



## SUPERIOR INSTRUMENTS CO.

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www.everything4lessstore.com

**THE MODEL TW-11** is a modern Tube Tester employing a newly-improved emission type circuit. It will quickly and efficiently test the ever-increasing number of tube types used in Radio and TV.

The Model TW-11 will test for quality of emission. It will also test for shorts and leakages and for noise due to faulty elements and loose internal connections.

Simplification of switching and controls has enabled us to present operating instructions in simple, easy-to-understand style. On the following pages, we have illustrated procedures wherever possible. We suggest you study the data and the instrument panel before you attempt to use the unit. The 10 minutes you spend in doing so will be well invested for if you acquire a proper understanding of how this unit works, it will become your most frequently used and indispensable tool.

Like all improved emission type testers, the Model TW-11 provides the means of making the three basic tests:

1. Tests for shorts and leakages
2. Test for quality (Good? Bad)
3. Test for noise.

It is always best to proceed with the short and leakage test first and then follow through with the quality test. It is advisable to do so because a "shorted" tube would be identified as such when making the short and leakage test. If such a tube were tested for quality first, it could damage the meter beyond repair.

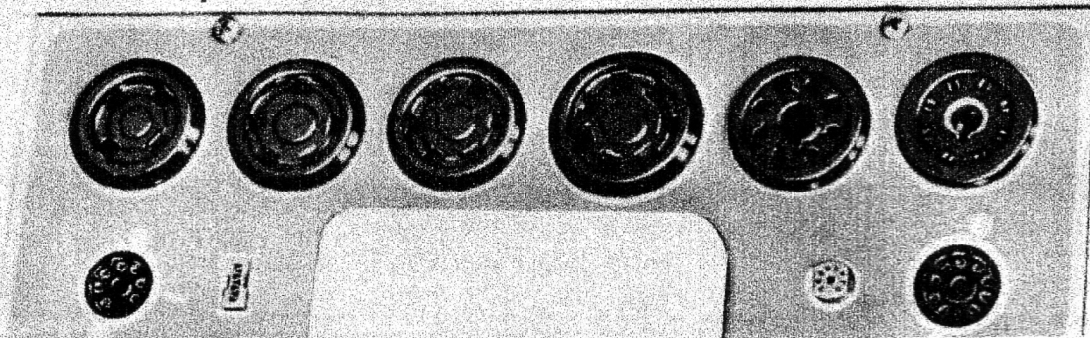


**PLEASE . . .**

Read this page and the following one before you attempt to use your Model TW-11.

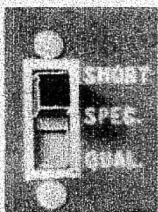
These two pages include a detailed description of the various front panel components and the manner in which they function.

You can get the most out of your instrument (any device in fact) if you fully understand the technical function of the various components. A detailed explanation of the front panel switches and controls appears herewith.



**TUBE SOCKETS** Always check to see if you are inserting the tube in the correct socket. Attempting to force a tube into the wrong socket may damage both. Be especially careful with 7 pin sub min types. The dot or red mark should be near the raised section of the socket.

### SHORT-QUALITY SWITCH



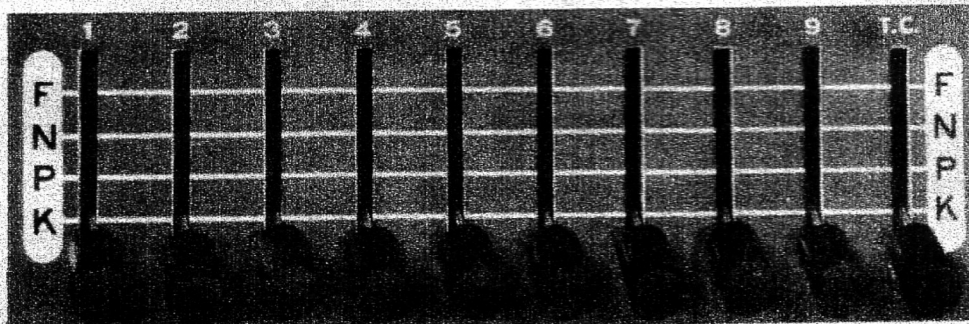
The position of the Short-Quality switch determines the type of test performed by the Model TW-11. When placed in the up or "Short" position, inter-element shorts and leakage are indicated by the leakage indicator lamp. When placed in the down or "Quality" position, the quality of the tube under tests is indicated on the meter. The center or "Special" position applies a higher test voltage to a tube. It is used only when the letter (S) appears after an element in the "P" column of the chart.

### TOP CAP LEAD



This lead is always connected to the top-cap of the tube under test. If the tube under test does not have a top-cap, do not allow the lead to touch any metal part of the instrument.

### ELEMENTAL LEVER SWITCHES



The lever switches connect the various tube elements to their respective test circuits. The letters F, N, P, and K represent the following functions:

**F**—(Filament) When any element is switched to this position, the voltage selected by the filament voltage switch is impressed between this element and all other elements left in the "K" position.

**N**—(Neutral) When any element is switched to this position, the element is isolated from all other elements in the tube. It is used to isolate an element such as a tapped filament from all other elements during the tube test.

**P**—(Plate Position) This position connects the meter during quality tests and the indicator lamp during the short test to the element under test.

**K**—(Cathode Position) All switches not used in the actual test are left in this position and act as part of the cathode or return circuit.

The elemental switches are numbered 1 to 9 to correspond to the RMA basing of the tube. The 10th switch marked "T.C." is used to connect the Top-Cap lead into the circuit when needed.



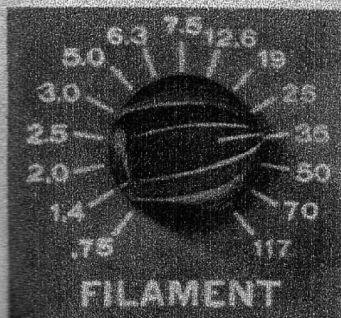
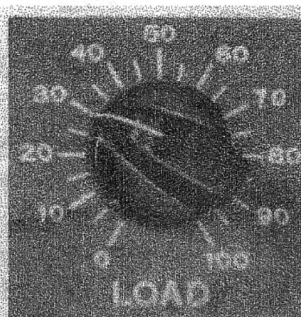


## LEAKAGE INDICATOR

An inter-element short or leakage is shown as a steady glow by the leakage indicator. A "flash" of the indicator when switches are moved may be disregarded as it is due to wiring and tube inter-electrode capacity.

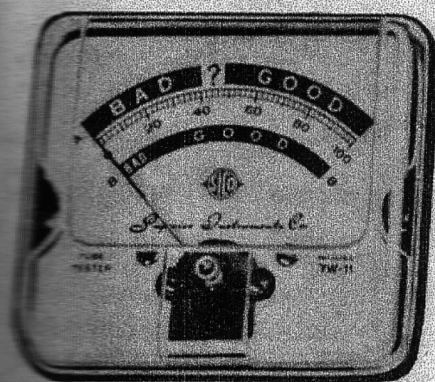
## LOAD CONTROL

The load control determines the amount of loading placed upon a tube under test. The smaller the number, the greater the current drawn from the tube under test.



## FILAMENT VOLTAGE SELECTOR

The filament voltage selector selects the correct operating potential for the filament of the tube under test. Do not under any circumstances turn this switch after a tube is inserted into any of the test sockets. The switch should always be set before inserting a tube.



## METER

The meter is used to read quality (emission) of the tube under test. It includes 3 calibrated scales. The topmost or "A" scale is used for most tubes. These tubes have the letter "A" appearing after their "load" setting on the roll chart. The Red section (Bad) indicates below normal tube emission. The white section (?) indicates doubtful tube emission. The green section (Good) indicates sufficient tube emission to enable good tube performance.

The center or linear scale is provided as a means of comparing the relative emission between tubes of the same type. The lower or "B" scale is used whenever the letter "B" appears on the roll chart after the "load"

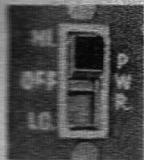
setting of a tube. This scale provides means of testing tubes having low emission such as high voltage rectifiers and certain battery tubes. The scale markings are similar to the "A" scale.

The meter pointer should always rest at zero when the unit is not in use. If the needle should shift to either below or above the zero mark, you can adjust it by turning the zero adjustment screw, which is located on the bottom of the meter front.

## ROLL CHART

6BD7	1.5	4	—	5	100B	5	12A5	12.6	2	—	5	31A	7
6BD7	1.5	4	—	5	100B	5	12A7	12.6	1	—	T.C.	10A	7
6BD7	1.5	4	—	5	100B	5	12A7	12.6	1	—	5	30A	7
6BD7	1.5	4	—	5	100B	5	12A8	12.6	2	—	5	35A	7
6BD7	1.5	4	—	5	100B	5	12A4	12.6	4	3.7	2	30A	7
TUBE TYPE	FIL V	F	N	P	LOAD	FIL CONT	TUBE TYPE	FIL V	F	N	P	LOAD	FIL CONT

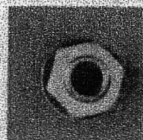
The roll chart provides the necessary tube data settings for the controls and various switches. It also indicates which meter scale is used. Tubes listed more than once are multi-section tubes and are equivalent to several tubes in the same envelope. All sections must therefore test good for the complete tube to be good.



## POWER SWITCH

The power switch is used to place the instrument into operating condition and also to adjust the instrument to various line voltages.

When using the Model TW-11 on power lines having a voltage between 115 and 125 Volts, throw the power switch up to the "Hi" position. When using the Model TW-11 on power lines having a voltage between 105 and 115 Volts, throw the power switch down to the "Lo" position. When in doubt as to the voltage of a power line, leave the switch in the upper or "Hi" position.



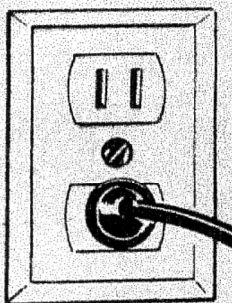
## NOISE JACK

When a pair of magnetic phones (not supplied) are plugged into this jack, noise caused by loose elements can be heard.



# To Test a Tube for Shorts and Leakages

1



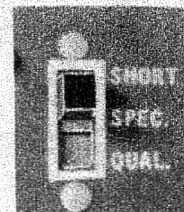
Insert the line cord into any 110 Volt, 60 cycle A.C. line.

2



Place the power switch up to the "Hi" position if the power line voltage is between 115 and 125 volts and down to the "Lo" position if the power line voltage is between 105 and 115 volts. If in doubt, use the "Hi" position.

3



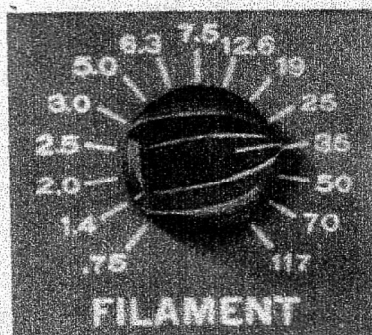
Throw the "Short-Quality" switch to the "Short" position.

4

TUBE TYPE	FIL. V.	F	N	P	LOAD	FIL. CONT.	TUBE TYPE	FIL. V.	F	N	P	LOAD	FIL. CONT.
6BC7	6.3	4	—	8	100B	3	12AB	12.6	2	—	5	30A	7
6BC7	6.3	4	—	8	100B	5	12A7	12.6	1	—	T.C.	30A	7
6BC8	6.3	4	—	2	30A	5	12A7	12.6	1	—	5	30A	7
6BC8	6.3	4	—	7	30A	5	12A6	12.6	2	—	5	30A	7
6BD4	6.3	2	—	5	30B	7	12A4	12.6	4	3.7	2	30A	5

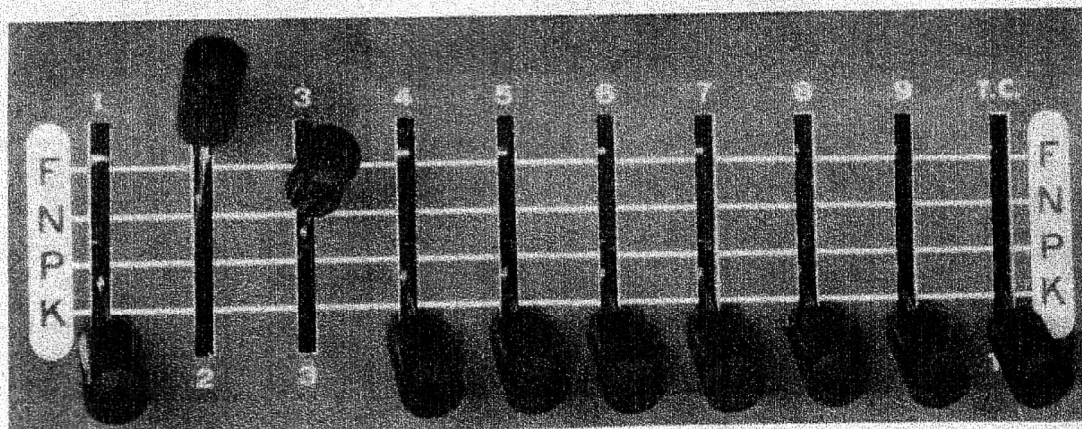
Rotate the roll chart until the required tube test data appears.

5



Turn the filament switch to the voltage indicated on the roll chart for the tube type under test.

6



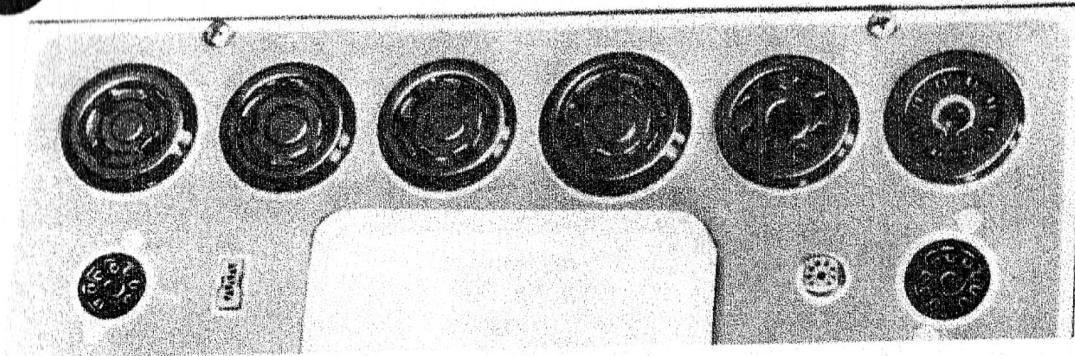
Place lever switches in the "F" and "N" columns as directed on roll chart. All other levers should be down in the "K" position.

(The element listed in the "P" column is placed in the "P" position for quality tests only.)

(continued)

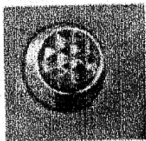
## To Test Tubes for Shorts and Leakages

7

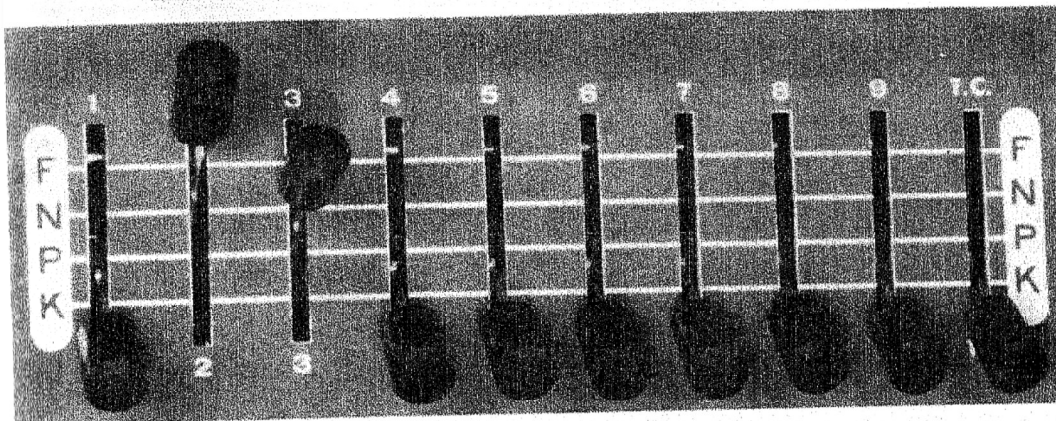


Insert the tube to be tested into its correct socket. Allow the tube to warm up for at least 30 seconds. Be especially careful with 7 pin sub min types. The dot or red mark should be near the raised section of the socket.

8



INDICATOR  
LAMP



One at a time, move each lever (except those previously placed in the "F" or "N" positions) up to the "P" position. Tap the tube and observe the neon indicator lamp. A glow when any of the levers are moved to the "P" position indicates a "short." Each lever switch must be returned to its "K" position before proceeding with the next element test. Do not place more than one switch in the "P" position at any time.

A slight glow may be disregarded when testing audio tubes such as the 6L6, 43, 50L6, etc. These tubes have a high inherent leakage, which in many cases does not effect the operation of the tube. No glow is of course desirable but a slight glow may be considered passable.

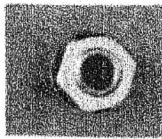
A steady glow on any element listed in the filament continuity column of the roll chart does not indicate a shorted tube. It does indicate filament continuity.

## TO TEST FOR FILAMENT CONTINUITY

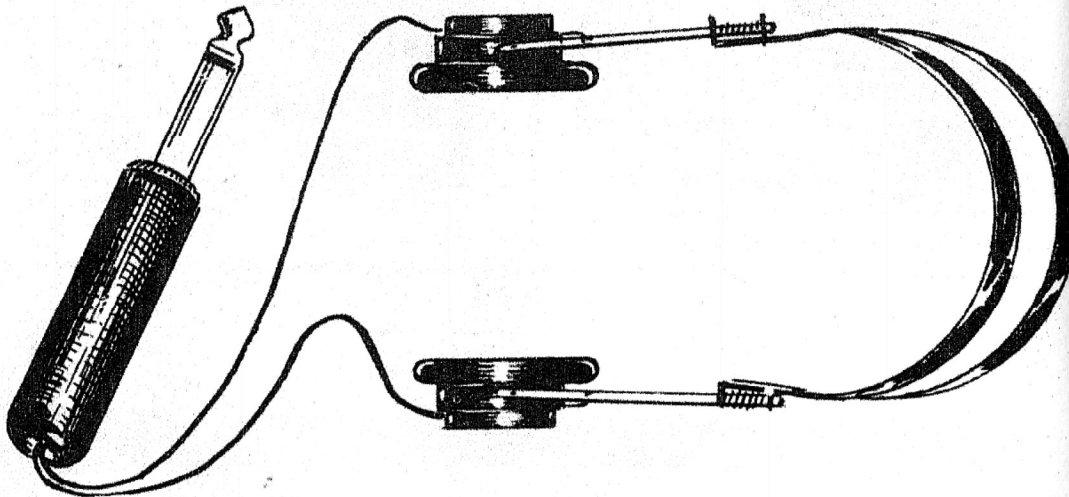
To test for filament continuity, proceed as in "To test for shorts and leakages", but use the lever switch listed in the filament continuity column. When this switch is moved to "P", the indicator lamp will glow if the filament is good. No glow indicates an open filament.



1



## NOISE JACK

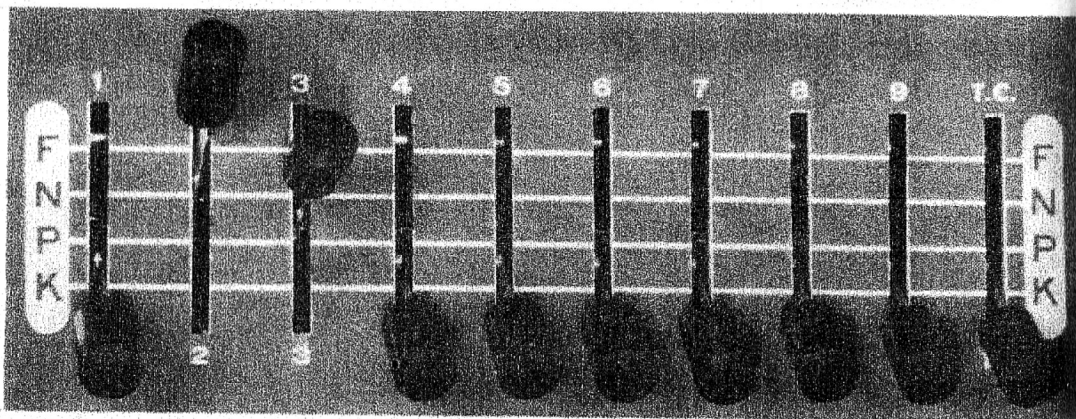


Plug a pair of magnetic phones (crystal phones won't do) into the phone jack marked "noise-test."

2

Next, follow procedures 1 to 7 as outlined in test for "To Test For Shorts and Leakages" except "Short-Quality" switch is moved to the "Quality" position.

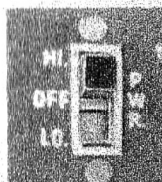
3



Now, move each lever individually up to the "P" position, tapping the tube as you do so. Tubes, which are microphonic due to loose elements or touching elements, will cause a pinging sound in the phones. This "ping" will be heard superimposed above the hum of the tube if hum is present.

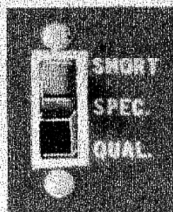
# TO TEST A TUBE FOR QUALITY

(AFTER FIRST CHECKING FOR SHORTS AND LEAKAGES)



Place the power-switch up in the "Hi" position if the power-line voltage is between 115 and 125 volts. If the power line voltage is between 105 and 115 volts, place the power-switch down in the "Lo" position. If in doubt, use the "Hi" position.

2

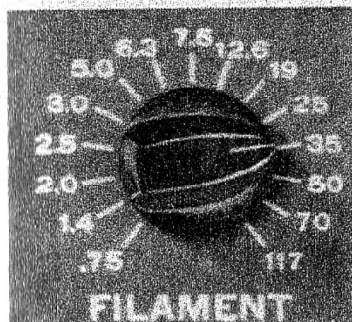


Place the "Short-Quality" switch in the down or "Quality" position.

If the letter (S) appears after the element listed in the "P" column, the switch is placed in the "Special" or center position. Disregard the neon lighting when the "Short-Quality" switch is in its "Special" position.

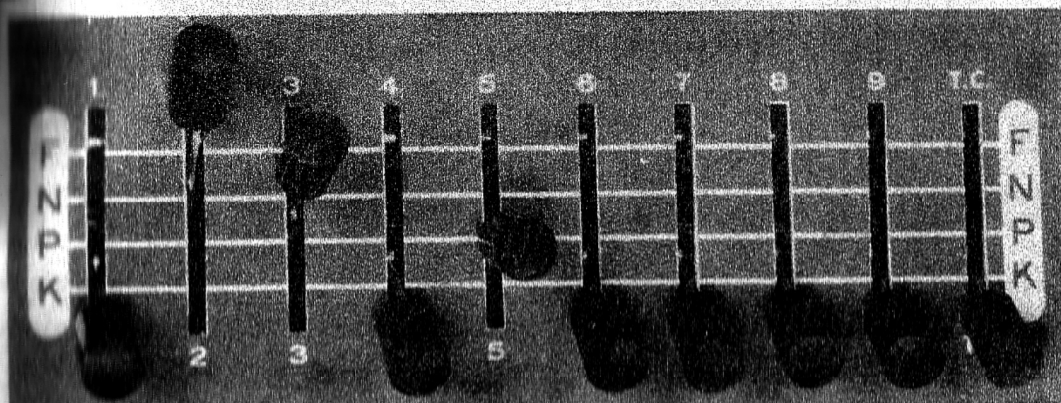
6DC7	5.0	1	—	5	10B	5	12A8	12.5	1	—	2	30A	7
6DC7	5.0	1	—	5	10B	5	12A7	12.5	1	—	2	30A	7
6DC8	5.0	1	—	5	10A	5	12A7	12.5	1	—	2	30A	7
6DC8	5.0	1	—	5	10A	5	12A6	12.5	1	—	2	30A	7
6DC8	5.0	1	—	5	10A	5	12A4	12.5	1	—	2	30A	7
6DC8	5.0	1	—	5	10A	5							
TUBE TYPE	FIL V	F	N	P	LOAD	FIL CONT	TUBE TYPE	FIL V	F	N	P	LOAD	FIL CONT

Rotate the roll chart until the required tube test data appears.



Turn the filament switch to the voltage indicated on the roll chart for the tube type under test.

Place the lever switches appearing in the "F" and "N" columns in their respective positions.



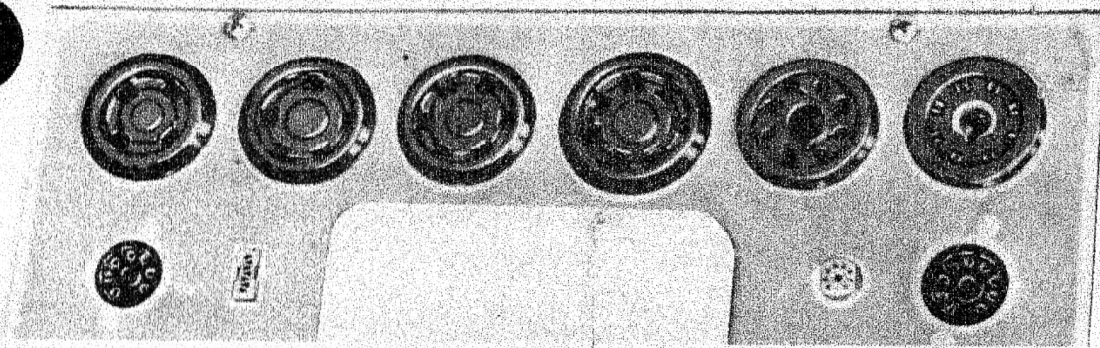
Place the lever switch appearing in the "P" column in the "P" position. If the letter "S" appears after the "P" setting, move the "Short-Quality" switch to "Spec." All other levers should be down in the "K" position.



# TO TEST A TUBE FOR QUALITY

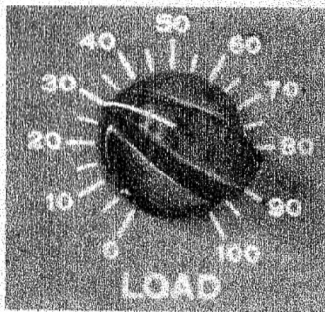
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6



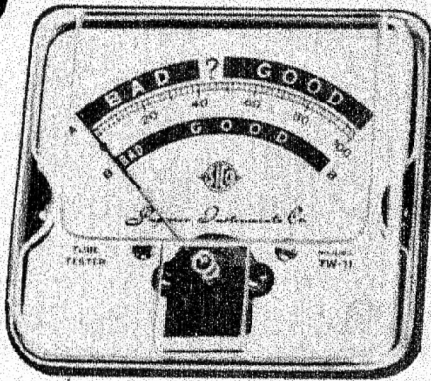
Insert the tube to be tested into its correct socket. Allow the tube to warm up for at least 30 seconds. Be especially careful with 7 pin sub min types. The dot or red mark should be near the raised section of the socket.

7



Rotate the "load" control to the setting indicated on the roll chart in the "load" column.

8



## READ QUALITY DIRECT ON METER SCALE

**IMPORTANT:** The letter "A" or "B" appearing directly after the ROLL CHART "load" setting, indicates the scale to be read. (Most tubes use scale A).

Top scale (A) is specified for tubes with a plate current exceeding 10 milliamperes. This applies to the majority of tubes.

Bottom scale (B) is specified for the relatively small number of tubes with a plate current of less than 10 milliamperes—mostly battery tubes.

The linear (0 to 100) scale makes it possible to compare the relative emission of two or more tubes of the exact same type.

NOTE #1: Disregard the flash of the indicator lamp when the elemental switches are moved.

NOTE #2: The element listed in the "P" column of the chart is used only during the Quality test. It should not be left in the "P" position during the short test.

NOTE #3: Do not at any time have more than one element in the "P" position.

NOTE #4: Multiple listings for a tube indicates that the tube under test is a multiple section tube. All sections must read good.

# EXAMPLE OF A TYPICAL TUBE TEST

Type: 35Z5

## FIRST TEST FOR SHORTS AND LEAKAGE

- ✓ Insert line cord into 110 Volt A.C. line.
- ✓ Locate 35Z5 data on tube chart. (Reads as follows:)

<u>Tube</u>	<u>Fil. Volts</u>	<u>F</u>	<u>N</u>	<u>P</u>	<u>Load</u>	<u>Fil. Cont.</u>
35Z5	35	2	3	5	30A	7

- ✓ Depending on your line voltage, place the power switch in the "Hi" or "Lo" position.
- ✓ Throw the Short-Quality switch to the "Short" position.
- ✓ Turn the filament voltage switch to the "35" position.
- ✓ Place the #2 lever switch in the "F" position and the #3 lever switch in the "N" position. *All others should be down in the "K" position.*
- ✓ Insert the tube into the octal socket, which is the correct socket for the 35Z5. Allow the tube to warm up for at least 30 seconds.
- ✓ Now, one at a time, move each elemental lever switch (except number 2 and 3) up to the "P" position. Tap the tube and observe the "short" indicator lamp. A steady glow (not temporary flash) when the switches are moved to the "P" position indicates a short. Be sure to return each switch to "K" as you proceed.

## NOW CHECK FOR QUALITY

- ✓ Leave the power switch in the "On" position, (either "Hi" or "Lo" depending upon your line voltage).
- ✓ Place the short-quality switch in the "Quality" position.
- ✓ Leave filament switch in the "35" position.
- ✓ With the #2 elemental switch in the "F" position, the #3 switch in the "N" position, place the #5 switch in the "P" position. Make sure all other switches are down in the "K" position.
- ✓ Turn the load control to "30".
- ✓ Read the Quality directly on scale A of the meter.



# SERVICE NOTES FOR MODEL TW-11

1. A false "short" indication on tubes known to be good is usually caused by more than one lever being in the "P" position during the "short" test. This effect can also be caused by a shorted .01 Mfd. condenser connected to the short indicator lamp.
2. A low emission reading on all tubes can be caused by a damaged "load" control. It can also be caused if the knob on the filament voltage switch has loosened and shifted position thus applying a lower voltage on the filament of the tube under test.
3. Tubes burning out during a test is usually caused by the filament voltage knob shifting, thus putting a higher filament voltage on the tube.
4. The neon indicator glowing during the "short" test with no tube inserted in a tube socket usually indicates a short in one of the sockets.
5. Inability to test tubes that use the T.C. lever as a test can usually be traced to a broken top cap lead.
6. No "quality" (emission) reading on good tubes usually indicates a burnt out 1,000 Ohm resistor, dirty or corroded contacts on the "short-quality" switch, or a burnt out meter.
7. High emission readings on all tubes with the "load" control having no effect is usually caused by an open or burnt out load control.
8. No emission readings when the "short-quality" switch is set to "special" can be caused by a burnt out 5,000 Ohm resistor or an open high voltage winding in the transformer.
9. The neon lighting when the "short-quality" switch is set to "special" is normal and may be disregarded.

## REPLACEMENT PARTS LIST FOR MODEL TW-11

Roll Chart .....	\$1.00
(To keep your instrument up to date you need only replace the paper roll chart annually. We revise roll charts as frequently as necessary depending upon the release of sufficient new tubes).	
Complete Meter .....	\$9.50
Meter Front .....	\$1.00
Lever switch assembly, complete .....	\$4.00
Individual lever switch .....	\$1.00
Filament voltage switch .....	\$2.00
Load Control .....	\$1.00
Transformer .....	\$7.50
Tube sockets, each .....	.50
Neon lamp .....	.25





# FOR MODEL TW-11

Inclusion of these tubes on our roll chart would have resulted in a much longer chart and consequently more time required to find tube types. The streamlined roll chart we now use will speed up your testing time.

Tube	Fil. Volts	F	N	P	Load	Fil. Cont.	Tube	Fil. Volts	F	N	P	Load	Fil. Cont.
0Z3	—	—	—	3s	30A	—	1E7	2.0	2		4	30A	7
1A3	1.4	1	2, 5	6	100A	7	1E7	2.0	2		5	30A	7
1A5	1.4	2		5	30A	7	1E8	1.4	5	1	2	80A	4
1A6	2.0	1		T.C.	60A	6	1F5	2.0	2		5	30A	7
1A7	1.4	2		5	60A	7	1F6	2.0	1		T.C.	50A	6
1AB5	1.4	1	7	6	30A	8	1F6	2.0	1		4	100B	6
1AB6	1.4	1		4	60A	7	1F6	2.0	1		5	100B	6
1AC5	1.4	4		2	60A	5	1F7	2.0	2		T.C.	30A	7
1AC6	1.4	1		4	60A	7	1F7	2.0	2		4	100B	7
1AD4	1.4	5		4	60A	3	1F7	2.0	2		5	100B	7
1AD5	1.4	5		2	100B	4	1G4	1.4	2		5	30A	7
1AE4	1.4	7	4, 5	6	50A	1	1G5	1.4	2		5	30A	7
1AE5	1.4	3		4	100B	5	1G6	1.4	2		4	50A	7
1AF4	1.4	7	5	6	60A	1	1G6	1.4	2		5	50A	7
1AF5	1.4	7		6	60A	1	1H4	2.0	2		5	50A	7
1AF5	1.4	7		3	100B	1	1H5	1.4	2		T.C.	60A	7
1AG4	1.4	3		4	60A	5	1H5	1.4	2		5	100B	7
1AG5	1.4	4		5	60A	6	1H6	2.0	2		4	100B	7
1AG5	1.4	4		3	60A	6	1H6	2.0	2		5	100B	7
1AH4	1.4	3		4	100B	5	1H6	2.0	2		6	40A	7
1AH5	1.4	7	2	3	100B	1	1J5	2.0	2		5	40A	7
1AH5	1.4	7	2	6	60A	1	1J6	2.0	2		4	40A	7
1AJ4	1.4	7	4, 5	6	60A	1	1J6	2.0	2		5	40A	7
1AJ5	1.4	4		3	100B	6	1N5	1.4	2		T.C.	60A	7
1AJ5	1.4	4		5	100B	6	1N6	1.4	2		5	40A	7
1B4	2.0	1		T.C.	60A	4	1N6	1.4	2		6	100B	7
1B5	2.0	1		3	60A	6	1P5	1.4	2		T.C.	60A	7
1B5	2.0	1		4	60A	6	1Q6	1.4	4		2	80A	5
1B7	1.4	2		5	60A	7	1Q6	1.4	4		6	100B	5
1B8	1.4	2		T.C.	30A	7	1SA6	1.4	2		4	100B	7
1B8	1.4	2		5	30A	7							
1B8	1.4	2		8	100A	7	1SB6	1.4	2		5	100B	7
1C3	1.4	1	2	4	60A	7	1SB6	1.4	2		8	40A	7
1C5	1.4	2		5	30A	7	1V	6.3	1		2	30A	4
1C6	2.0	1		4	60A	6	1V5	1.4	4		2	100B	7
1C7	2.0	2		5	60A	7	1V6	1.4	4		3	80B	7
1C8	1.4	4	1	2	60A	5	1V6	1.4	4		5	80B	7
1D5	2.0	2		T.C.	60A	7	1W4	1.4	7		6	60A	1
1D7	2.0	2		5	60A	7	1W5	1.4	4		2	80A	5
1D8	1.4	2		T.C.	30A	7	1Z2	1.4	4	1, 2, 3, 6, 7	T.C.s	80A	5
1D8	1.4	2		5	30A	7							
1D8	1.4	2		8	100B	7	2A3	2.5	1		3	30A	4
1DN5	1.4	1		6	50A	7	2A5	2.5	1		4	30A	6
1DN5	1.4	1		4	100B	7	2A6	2.5	1		3	60A	6
1E3	1.4	5	1	2	80A	4	2A6	2.5	1		4	60A	6
1E4	1.4	2		5	60A	7	2A6	2.5	1		T.C.	30A	6
1E5	2.0	2		T.C.	40A	7	2A7	2.5	1		5	30A	7

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Tube	Fil. Volts	F	N	P	Load	Fil. Cont.	Tube	Fil. Volts	F	N	P	Load	Fil. Cont.
2B6	2.5	1		4	30A	7	6AB6	6.3	2		5	30A	7
2B6	2.5	1		5	30A	7	6AB7	6.3	2		4	30A	7
2B7	2.5	1		4	60A	7	6AC5	6.3	2		5	30A	7
2B7	2.5	1		5	60A	7	6AC6	6.3	2		5	30A	7
2B7	2.5	1		T.C.	30A	7	6AD5	6.3	2		5	30A	7
2B25	1.4	1		4	100B	7	6AD6	6.3	2		5s	100A	7
2C4	2.5	1		3	30A	7	(Eye Open — Disregard Meter)						
2D21	6.3	3	5, 7	1	75A	4	6AD6	6.3	2		3, 5s	100A	7
2E5	2.5	1		2, 4s	50A	6	(Right Eye Closed — Disregard Meter)						
(Quality and Eye Closed)							6AD6	6.3	2		4, 5s	100A	7
2E5	2.5	1		4s	50A	6	(Left Eye Closed — Disregard Meter)						
(Eye Open Only)							6AD7	6.3	2		1	30A	7
2E26	6.3	2	1, 4	5	30A	7	6AD7	6.3	2		5	30A	7
2E30	6.3	3	7	1	30A	4	6AE5	6.3	2		5	30A	7
2E31	1.4	3		4	60A	5	6AE6	6.3	2		5	30A	7
2E32	1.4	3		4	60A	5	6AE7	6.3	2		4	30A	7
2E35	1.4	3		4	50A	5	6AE7	6.3	2		6	30A	7
2E36	1.4	3		4	50A	5	6AF5	6.3	2		5	30A	7
2E42	1.4	4		3	100B	6	6AF6	6.3	2		5s	100B	7
2E42	1.4	4		5	100B	6	(Eye Open — Disregard Meter)						
2G21	1.4	7		3	100B	4	6AF6	6.3	2		3, 5s	100B	7
2G22	1.4	7		3	100B	4	(Right Eye Closed — Disregard Meter)						
2V2	2.5	2	4, 5, 6, 8	T.C.s	30A	7	6AF6	6.3	2		4, 5s	100B	7
2X2	2.5	1		T.C.s	30A	4	(Left Eye Closed — Disregard Meter)						
2X3	2.5	1		4s	30A	8	6AG6	6.3	7		5	30A	8
3A4	3.0	1	5, 6	4	30A	7	6AH4	6.3	2		1	30A	7
3A5	3.0	1	4	3	60A	7	6AH5	6.3	2		6	30A	7
3A5	3.0	1	4	5	60A	7	6AH6	6.3	3		1	30A	4
3A8	3.0	2	1	5	60A	7	6AH7	6.3	7		1	30A	8
3A8	3.0	2	1	8	60A	7	6AH7	6.3	7		5	30A	8
3A8	3.0	2	1	T.C.	30A	7	6AJ7	6.3	2		4	30A	7
3B5	3.0	2	8	5	40A	7	6AK7	6.3	2	3	4	30A	7
3C5	3.0	2	8	5	40A	7	6AL7	6.3	2		3s	30A	7
3D6	3.0	1	7	6	40A	8	(Shadow Test)						
5AX4	5.0	2		6	40A	8	6AL7	6.3	2		4s	30A	7
5AX4	5.0	2		4	40A	8	(Quality Test)						
5T4	5.0	2		4	40A	8	6AN6	6.3	1		2	100B	7
5T4	5.0	2		6	40A	8	6AN6	6.3	1		3	100B	7
5X3	5.0	1		2	40A	4	6AN6	6.3	1		4	100B	7
5X3	5.0	1		3	40A	4	6AN6	6.3	1		5	100B	7
5X4	5.0	7		3	40A	8	6AQ6	6.3	3		1	30A	4
5X4	5.0	7		5	40A	8	6AQ6	6.3	3		5	100B	4
5Y4	5.0	7		3	40A	8	6AQ6	6.3	3		6	100B	4
5Y4	5.0	7		5	40A	8	6AX6	6.3	2		3	30A	7
5Z3	5.0	1		2	30A	4	6AX6	6.3	2		5	30A	7
5Z3	5.0	1		3	30A	4	6B4	6.3	2		3	30A	7
6A3	6.3	1		3	30A	4	6B5	6.3	1		4	30A	6
6A4	6.3	1		3	30A	5	6B6	6.3	2		4	100B	7
6A5	6.3	2	8	5	30A	7	6B6	6.3	2		5	100B	7
6A6	6.3	1		3	30A	7	6B6	6.3	2		T.C.	30A	7
6A6	6.3	1		5	30A	7	6B7	6.3	1		4	100B	7
6A7	6.3	1		5	30A	7	6B7	6.3	1		5	100B	7
6A8	6.3	2		5	30A	7	6B7	6.3	1		T.C.	30A	7
							6B8	6.3	2		4	100B	7
							6B8	6.3	2		5	100B	7



Tube	Fil. Volts	F	N	P	Load	Fil. Cont.	Tube	Fil. Volts	F	N	P	Load	Fil. Cont.
6B8	6.3	2		T.C.	30A	7	6N6	6.3	2		5	30A	7
6BA5	6.3	3		1	30A	6	6N7	6.3	2		4	30A	7
6BN7	6.3	4		2	30A	5	6N7	6.3	2		5	30A	7
6BN7	6.3	4		7	30A	5	6P7	6.3	2		T.C.	30A	3
6C5	6.3	2		5	30A	7	6P7	6.3	2		7	30A	3
6C6	6.3	1		T.C.	30A	6	6P8	6.3	2		T.C.	30A	7
6C7	6.3	1		4	100B	7	6P8	6.3	2		5	30A	7
6C7	6.3	1		5	100B	7	6Q6	6.3	2		5	100B	7
6C7	6.3	1		T.C.	30A	7	6Q6	6.3	2		4	100B	7
6C8	6.3	2		5	30A	7	6Q6	6.3	2		T.C.	30A	7
6C8	6.3	2		T.C.	30A	7	6Q7	6.3	2		T.C.	30A	7
6D5	6.3	2		5	30A	7	6Q7	6.3	2		4	100B	7
6D6	6.3	1		T.C.	30A	6	6Q7	6.3	2		5	100B	7
6D7	6.3	1		T.C.	30A	7	6R6	6.3	2		T.C.	30A	7
6D8	6.3	2		5	30A	7	6R7	6.3	2		4	100B	7
6E5	6.3	1		2, 4s	50A	6	6R7	6.3	2		5	100B	7
				(Quality and Eye Closed)			6R7	6.3	2		T.C.	30A	7
6E5	6.3	1		4s	50A	6	6S5	6.3	2		4	30A	7
				(Eye Open Only)			6S6	6.3	2		T.C.	30A	7
6E6	6.3	1		3	40A	7	6S7	6.3	2		T.C.	30A	7
6E6	6.3	1		5	40A	7	6S8	6.3	7		1	100B	8
6E7	6.3	1		T.C.	30A	7	6S8	6.3	7		3	100B	8
6E8	6.3	2		T.C.	30A	7	6S8	6.3	7		4	100B	8
6F5	6.3	2		T.C.	30A	7	6S8	6.3	7		T.C.	30A	8
6F7	6.3	1		5	30A	7	6SB7Y	6.3	2		5	30A	7
6F7	6.3	1		T.C.	30A	7	6SC7	6.3	7		3	30A	8
6F8	6.3	2		5	30A	7	6SC7	6.3	7		4	30A	8
6F8	6.3	2		T.C.	30A	7	6SD7	6.3	2		4	30A	7
6G5	6.3	1		2, 4s	50A	6	6SE7	6.3	2		4	30A	7
				(Quality and Eye Closed)			6SF5	6.3	7		3	30A	8
6G5	6.3	1		4s	50A	6	6SF7	6.3	7		2	30A	8
				(Eye Open Only)			6SF7	6.3	7		5	100B	8
6G6	6.3	2		5	30A	7	6SG7	6.3	2	3	4	30A	7
6H4	6.3	2		4	40A	7	6SH7	6.3	2	3	4	30A	7
6H5	6.3	1		2, 4s	50A	6	6SJ7	6.3	2		4	30A	7
				(Quality and Eye Closed)			6SK7	6.3	2		4	30A	7
6H5	6.3	1		4s	50A	6	6SR7	6.3	7		2	30A	8
				(Eye Open Only)			6SR7	6.3	7		4	100B	8
6H7	6.3	2		5	50A	7	6SR7	6.3	7		5	100B	8
6H7	6.3	2		T.C.	30A	7	6ST7	6.3	7		2	30A	8
6H8	6.3	2		4	100B	7	6ST7	6.3	7		4	100B	8
6H8	6.3	2		5	100B	7	6ST7	6.3	7		5	100B	8
6H8	6.3	2		T.C.	30A	7	6SZ7	6.3	7		2	30A	8
6J7	6.3	2		T.C.	30A	7	6SZ7	6.3	7		4	100B	8
6J8	6.3	2		5	60A	7	6SZ7	6.3	7		5	100B	8
6J8	6.3	2		T.C.	30A	7	6T5	6.3	1		2, 4s	50A	6
6K5	6.3	2		T.C.	30A	7					(Quality and Eye Closed)		
6K7	6.3	2		T.C.	30A	7	6T5	6.3	1		4s	50A	6
6K8	6.3	2		5	30A	7					(Eye Open Only)		
6L5	6.3	2		5	30A	7	6T7	6.3	2		4	100B	7
6L7	6.3	2		T.C.	30A	7	6T7	6.3	2		5	100B	7
6N5	6.3	1		2, 4s	50A	6	6T7	6.3	2		T.C.	30A	7
				(Quality and Eye Closed)			6U5	6.3	1		2, 4s	50A	6
6N5	6.3	1		4s	50A	6					(Quality and Eye Closed)		
				(Eye Open Only)			6U5	6.3	1		4s	50A	6



Tube	Fil. Volts	F	N	P	Load	Fil. Cont.	Tube	Fil. Volts	F	N	P	Load	Fil. Cont.
(Eye Open Only)													
6U6	6.3	2		5	30A	7	7F7	6.3	1		4	30A	8
6V7	6.3	2		T.C.	30A	7	7F7	6.3	1		5	30A	8
6V7	6.3	2		4	100B	7	7F8	6.3	2		1	30A	7
6V7	6.3	2		5	100B	7	7F8	6.3	2		8	30A	7
6W5	6.3	2		3	30A	7	7G7	6.3	1		6	30A	8
6W5	6.3	2		5	30A	7	7G8	6.3	1		4	30A	8
6W7	6.3	2		T.C.	30A	7	7G8	6.3	1		5	30A	8
6X6	6.3	2		4	30A	7	7H7	6.3	1		6	30A	8
6Y3	6.3	2		T.C.	30A	7	7J7	6.3	1		4	30A	8
6Y7	6.3	2		4	30A	7	7J7	6.3	1		6	30A	8
6Y7	6.3	2		5	30A	7	7K7	6.3	1		4	30A	8
6Z6	6.3	2		3	30A	7	7K7	6.3	1		5	100B	8
6Z6	6.3	2		5	30A	7	7K7	6.3	1		6	100B	8
6Z7	6.3	2		4	30A	7	7L7	6.3	1		6	30A	8
6Z7	6.3	2		5	30A	7	7N7	6.3	1		4	30A	8
6ZY5	6.3	2		3	30A	7	7N7	6.3	1		5	30A	8
6ZY5	6.3	2		5	30A	7	7Q7	6.3	1		4	30A	8
							7R7	6.3	1		3	100B	8
7A4	6.3	1		6	30A	8	7R7	6.3	1		4	100B	8
7A5	6.3	1		6	30A	8	7R7	6.3	1		6	30A	8
7A6	6.3	1		3	30A	8	7S7	6.3	1		4	30A	8
7A6	6.3	1		6	30A	8	7S7	6.3	1		6	30A	8
7A7	6.3	1		6	30A	8	7T7	6.3	1		6	30A	8
7A8	6.3	1		4	30A	8	7V7	6.3	1		6	30A	8
7AB7	6.3	2	4, 6	5	30A	7	7W7	6.3	1	7	6	30A	8
7AD7	6.3	1		6	30A	8	7X6	6.3	1		3	30A	8
7AF7	6.3	1		4	30A	8	7X6	6.3	1		6	30A	8
7AF7	6.3	1		5	30A	8	7X7	6.3	1		3	30A	8
7AG7	6.3	1	5	6	30A	8	7X7	6.3	1		5	30A	8
7AH7	6.3	1		6	30A	8	7Y4	6.3	1		6	100B	8
7AJ7	6.3	1		6	30A	8	7Y4	6.3	1		3	30A	8
7AK7	6.3	1		6	30A	8	7Z4	6.3	1		6	30A	8
7B4	6.3	1		6	30A	8	7Z4	6.3	1		3	30A	8
7B5	6.3	1		6	30A	8	12A6	12.6	2		5	30A	7
7B6	6.3	1	4	3	30A	8	12A7	12.6	1		T.C.	30A	7
7B6	6.3	1	4	5	100B	8	12A7	12.6	1		5	30A	7
7B6	6.3	1	4	6	100B	8	12A8	12.6	2		5	30A	7
7B7	6.3	1		6	30A	8	12B6	12.6	2		5	100B	7
7B8	6.3	1		4	30A	8	12B6	12.6	2		T.C.	30A	7
7C4	6.3	1		4	60A	8	12B7	12.6	1		6	30A	8
7C5	6.3	1		6	30A	8	12B8	12.6	2		T.C.	30A	7
7C6	6.3	1	4	3	30A	8	12B8	12.6	2		8	30A	7
7C6	6.3	1	4	5	100B	8	12E5	12.6	2		5	30A	7
7C6	6.3	1	4	6	100B	8	12F5	12.6	2		T.C.	30A	7
7C7	6.3	1		6	30A	8	12G7	12.6	2		4	100B	7
7D7	6.3	1		4	30A	8	12G7	12.6	2		5	100B	7
7D7	6.3	1		6	30A	8	12G7	12.6	2		T.C.	30A	7
7E5	6.3	2	5, 6, 7,	1	30A	8	12G8	12.6	4	9	3	60A	5
7E6	6.3	1	4	3	30A	8	12G8	12.6	4	9	8	60A	5
7E6	6.3	1	4	5	100B	8	12H4	12.6	3	2, 5	6	30A	4
7E6	6.3	1	3	6	100B	8	12H6	12.6	2		3	30A	7
7E7	6.3	1		3	100B	8	12H6	12.6	2		5	30A	7
7E7	6.3	1		4	100B	8	12J5	12.6	2		5	30A	7
7E7	6.3	1		6	30A	8	12J7	12.6	2		T.C.	30A	7
							12J8	12.6	4		1	30A	5



ube	Fil. Volts	F	N	P	Load	Fil. Cont.	Tube	Fil. Volts	F	N	P	Load	Fil. Cont.
2J8	12.6	4		8	50A	5	14J7	12.6	1		6	30A	8
2J8	12.6	4		9	50A	5	14N7	12.6	1		4	30A	8
2K7	12.6	2		T.C.	30A	7	14N7	12.6	1		5	30A	8
2K8	12.6	2		5	30A	7	14Q7	12.6	1		4	30A	8
2L8	12.6	2		1	30A	7	14R7	12.6	1		3	100B	8
2L8	12.6	2		3	30A	7	14R7	12.6	1		4	100B	8
2Q7	12.6	2		4	100B	7	14R7	12.6	1		6	30A	8
2Q7	12.6	2		5	100B	7	14S7	12.6	1		4	30A	8
2Q7	12.6	2		T.C.	30A	7	14S7	12.6	1		6	60A	8
2S8	12.6	7		1	100B	8	14W7	12.6	1	4	6	30A	8
2S8	12.6	7		3	100B	8	14X7	12.6	1		3	30A	8
2S8	12.6	7		4	100B	8	14X7	12.6	1		5	100B	8
2S8	12.6	7		T.C.	30A	8	14X7	12.6	1		6	100B	8
2SB7	12.6	2		5	30A	7	14Y4	12.6	1		3	30A	8
2SC7	12.6	7		3	30A	8	14Y4	12.6	1		6	30A	8
2SC7	12.6	7		4	30A	8	15A6	12.6	4	9	2	30A	5
2SF5	12.6	7		3	30A	8	15A8	12.6	2		3	30A	7
2SF7	12.6	7		2	30A	8	15A8	12.6	2		4	30A	7
2SF7	12.6	7		5	100B	8	16A5	12.6	4	1,8	2	35A	5
2SG7	12.6	2	3	4	30A	7	16A8	19	4		1	35A	5
2SH7	12.6	2	3	4	30A	7	16A8	19	4		3	40A	5
2SR7	12.6	7		2	30A	8							
2SR7	12.6	7		4	100B	8	19	2.0	1		3	30A	6
2SR7	12.6	7		5	100B	8	19	2.0	1		4	30A	6
2SW7	12.6	7		2	30A	8	19BG6	19	2		5	25A	7
2SW7	12.6	7		4	100B	8	19C8	19	4		1	100B	5
2SW7	12.6	7		4	100B	8	19C8	19	4		2	100B	5
2SW7	12.6	7		5	100B	8	19C8	19	4		6	100B	5
2SX7	12.6	7		1	30A	8	19C8	19	4		8	30A	5
2SX7	12.6	7		4	30A	8	19J6	19	3		5	30A	4
2SY7	12.6	2		5	30A	7	19J6	19	3		6	30A	4
2Z3	12.6	1		2	30A	4	19T8	19	4		1	100B	5
14A4	12.6	1		6	30A	8	19T8	19	4		2	100B	5
14A5	12.6	1		6	30A	8	19T8	19	4		6	100B	5
14A7	12.6	1		6	30A	8	19T8	19	4		8	30A	5
14AF7	12.6	1		4	30A	8	19V8	19	4		2	100B	5
14AF7	12.6	1		5	30A	8	19V8	19	4		6	30A	5
14B6	12.6	1	4	3	30A	8	19V8	19	4		7	100B	5
14B6	12.6	1	4	5	100B	8	19V8	19	4		9	100B	5
14B6	12.6	1	4	6	100B	8	19X8	19	4		2	30A	5
14B8	12.6	1		4	30A	8	19X8	19	4		7	30A	5
14C5	12.6	1		6	30A	8	19Y3	19	4	1,2,6 7,8	9	30A	5
14C7	12.6	1		6	30A	8							
14E6	12.6	1	4	3	30A	8							
14E6	12.6	1	4	5	100B	8	21A6	25	4	9	2	35A	5
14E6	12.6	1	4	6	100B	8	21A7	25	1		4	60A	8
14E7	12.6	1		3	100B	8	21A7	25	1		6	30A	8
14E7	12.6	1		4	100B	8							
14E7	12.6	1		6	30A	8	22	3.0	1		T.C.	60A	4
14F7	12.6	1		4	30A	8	24A	2.5	1		T.C.	30A	5
14F7	12.6	1		5	30A	8							
14F8	12.6	2		1	30A	7	25A6	25	2		5	30A	7
14F8	12.6	2		8	30A	7	25A7	25	2		5	30A	7
14H7	12.6	1		6	30A	8	25A7	25	2		6	30A	7
14J7	12.6	1		4	30A	8	25B6	25	2		5	30A	7

Tube	Fil. Volts	F	N	P	Load	Fil. Cont.	Tube	Fil. Volts	F	N	P	Load	Fil. Cont.
25B8	25	2		T.C.	30A	7	42	6.3	1		4	30A	6
25B8	25	2		8	30A	7	43	25	1		4	30A	6
25C5	25	3	2	5	30A	4	44	2.5	1		T.C.	30A	5
25D8	25	2		T.C.	30A	7	45	2.5	1		3	30A	4
25D8	25	2		5	30A	7	46	2.5	1		3	30A	5
25D8	25	2		8	100B	7	47	2.5	1		3	30A	5
25N6	25	2		5	30A	7	49	2.0	1		3	30A	5
25X6	25	2		3	30A	7							
25X6	25	2		8	30A	7	50	7.5	1		3	30A	4
25Y4	25	2		5	30A	7	50A5	50	1		6	30A	8
25Y5	25	1		2	30A	6	50X6	50	1		3	30A	8
25Y5	25	1		5	30A	6	50X6	50	1		6	30A	8
25Z3	25	1		2	30A	4	50Y6	50	2		3	30A	7
25Z4	25	2		5	30A	7	50Y6	50	2		6	30A	7
25Z5	25	1		2	30A	6	50Y7	50	2	6	3	30A	7
25Z5	25	1		5	30A	6	50Y7	50	2	6	5	30A	7
25Z6	25	2		3	30A	7	50Z6	50	2		3	30A	7
25Z6	25	2		5	30A	7	50Z6	50	2		5	30A	7
26A6	25	3		1	60A	4	50Z7	50	2	6	3	30A	7
26A7	25	6		1	30A	7	50Z7	50	2	6	5	30A	7
26A7	25	6		3	30A	7	51	2.5	1		T.C.	30A	5
26BK6	25	3		1	30A	4	53	2.5	1		3	30A	7
26BK6	25	3		5	100B	4	53	2.5	1		5	30A	7
26BK6	25	3		6	100B	4	55	2.5	1		3	100B	6
26C6	25	3		1	40A	4	55	2.5	1		4	100B	6
26C6	25	3		5	100B	4	55	2.5	1		T.C.	40A	6
26C6	25	3		6	100B	4	56	2.5	1		3	30A	5
26D6	25	3		1	60A	4	57	2.5	1		T.C.	30A	6
26Z5W	25	4	9	1	30A	5	58	2.5	1		T.C.	30A	6
26Z5W	25	4	9	6	30A	5	59	2.5	1		4	30A	7
27	2.5	1		3	30A	5							
28D7	25	1		2	30A	8	70A7	70	2	6	1	30A	7
28D7	25	1		7	30A	8	70A7	70	2	6	5	30A	7
28Z5	25	1	4	3	30A	8	70L6	70	2		5	30A	7
28Z5	25	1	4	6	30A	8	70L6	70	2		8	30A	7
							70L7	70	2		5	30A	7
30	2.0	1		3	40A	4	70L7	70	2		8	30A	7
31	2.0	1		3	30A	4							
32	2.0	1		T.C.	30A	5	71	5.0	1		3	30A	4
32L7	35	2		5	30A	7	75	6.3	1		3	100B	6
32L7	35	2		6	30A	7	75	6.3	1		4	100B	6
33	2.0	1		3	30A	5	75	6.3	1		T.C.	30A	6
34	2.0	1		T.C.	30A	4	76	6.3	1		3	30A	5
35	2.5	1		T.C.	30A	5	77	6.3	1		T.C.	30A	6
35A5	35	1		6	30A	8	78	6.3	1		T.C.	30A	6
35A6	35	1		6	30A	8	79	6.3	1		3	30A	6
35Y4	35	1	4	2	30A	8	79	6.3	1		T.C.	30A	6
35Z6	35	2		3	30A	7	80	5.0	1		2	50A	4
35Z6	35	2		5	30A	7	80	5.0	1		3	50A	4
36	6.3	1		T.C.	30A	5	81	7.5	1		2	50A	4
37	6.3	1		3	30A	5	83	5.0	1		2	20B	4
38	6.3	1		T.C.	30A	5	83	5.0	1		3	20B	4
39	6.3	1		T.C.	30A	5	83V	5.0	1		2	40A	4
40Z5	35	2	3	5	30A	7	83V	5.0	1		3	40A	4
41	6.3	1		4	30A	6	84	6.3	1		2	40A	5



Tube	Fil. Volts	F	N	P	Load	Fil. Cont.	Tube	Fil. Volts	F	N	P	Load	Fil. Cont.
84	6.3	1		3	40A	5	1852	6.3	2		4	30A	7
85	6.3	1		3	100B	6	1853	6.3	2		4	30A	7
85	6.3	1		4	100B	6	2050	6.3	2		3	30A	7
85	6.3	1		T.C.	30A	6	5618	6.3	1	5	6	50A	7
89	6.3	1		T.C.	30A	6	5635	6.3	3	4	1	30A	6
							5635	6.3	3	4	2	30A	6
117L7	117	2		4	30A	7	5636	6.3	3	8	1	60A	6
117L7	117	2		6	30A	7	5637	6.3	3		1	30A	6
117M7	117	2		4	30A	7	5640	6.3	3	4	1	30A	6
117M7	117	2		6	30A	7	5641	6.3	3		4	100B	6
117N7	117	2		4	30A	7	5643	6.3	3	4, 8	7	30A	6
117N7	117	2		8	30A	7	5654	6.3	3	2	1	30A	4
117P7	117	2		4	30A	7	5656	6.3	4		2	30A	5
117P7	117	2		8	30A	7	5656	6.3	4		3	30A	5
							5670	6.3	1		3	30A	9
884	6.3	2		5	30A	7	5670	6.3	1		7	30A	9
885	2.5	1		3	30A	5	5672	1.4	5		4	100B	3
1003	—	—	—	3s	30A	—	5676	1.4	2		3	100B	4
1003	—	—	—	5s	30A	—	5678	1.4	3		4	100B	5
1006	1.4	1		2	100B	4	5686	6.3	4	1, 3, 6	2	30A	5
1006	1.4	1		3	100B	4	5687	12.6	4	8	2	30A	5
1201	6.3	2	3, 4, 5	1	30A	8	5687	12.6	4	8	7	30A	5
1203	6.3	1		4	30A	8	5690	6.3	1	6	3	30A	2
1204	6.3	2	4, 6	5	30A	7	5690	6.3	6	1	5	30A	7
1206	6.3	1		4	30A	8	5691	6.3	7		1	30A	8
1223	6.3	2		T.C.	30A	7	5691	6.3	7		4	30A	8
1231	6.3	1		6	30A	8	5693	6.3	2		4	30A	7
1232	6.3	1		6	30A	8	5696	6.3	3	5	1	30A	4
1247	.75	4		T.C.s	100B	5	5718	6.3	3		1	30A	6
	(Use Pins 4 and 5 Only)						5719	6.3	3		1	30A	6
1273	6.3	1	5	6	30A	8	5725	6.3	3		1	30A	4
1280	12.6	1		6	30A	8	5726	6.3	3		2	30A	4
1284	12.6	1		6	30A	8	5726	6.3	3		7	30A	4
1291	1.4	1	4	3	60A	8	5727	6.3	3	7	1	30A	4
1291	1.4	1	4	6	60A	8	5744	6.3	2		4	60A	3
1293	1.4	1		6	60A	8	5749	6.3	3		1	30A	4
1294	1.4	1		4	60A	8	5750	6.3	3		1	30A	4
1299	1.4	1	7	6	30A	8	5751	12.6	4	9	2	30A	5
1611	6.3	2		5	30A	7	5751	12.6	4	9	7	30A	5
1612	6.3	2		T.C.	30A	7	5763	6.3	4	9	8	30A	5
1620	6.3	2		T.C.	30A	7	5797	25	4		1	30A	5
1621	6.3	2		5	30A	7	5798	25	4		2	30A	5
1622	6.3	2		5	30A	7	5798	25	4		7	30A	5
1631	12.6	2		5	30A	7	5814	12.6	4	9	2	30A	5
1632	12.6	2		5	30A	7	5814	12.6	4	9	7	30A	5
1633	25	7		1	30A	8	5839	25	2		3	30A	7
1633	25	7		4	30A	8	5839	25	2		5	30A	7
1634	12.6	7		3	30A	8	5840	6.3	3	4, 8	1	30A	6
1634	12.6	7		4	30A	8	5845	5.0	3	7	1	100B	4
1635	6.3	2		4	30A	7	5845	5.0	3	7	5	100B	4
1635	6.3	2		5	30A	7	5852	6.3	2		3	30A	7
1644	12.6	6		1	30A	7	5852	6.3	2		5	30A	7
1644	12.6	6		3	30A	7	5875	1.4	3		4	100B	5
1654	1.4	1	2, 3, 6	T.C.	100B	7	5879	6.3	4		1	30A	5
1851	6.3	2		T.C.	30A	7	5881	6.3	2		5	30A	7



Tube	Fil. Volts	F	N	P	Load	Fil. Cont.	Tube	Fil. Volts	F	N	P	Load	Fil. Cont.
5896	6.3	3		7	30A	6	7027	6.3	2	1, 6	5	30A	7
5896	6.3	3		1	30A	6	7044	12.6	4	8	2	30A	5
5898	6.3	3		1	30A	6	7044	12.6	4	8	7	30A	5
5899	6.3	3	4, 8	1	30A	6	7167	6.3	3	7	1	30A	4
5902	6.3	3	4, 8	1	30A	6	7247	12.6	4	9	2	30A	5
5915	6.3	3		1	30A	4	7247	12.6	4	9	7	30A	5
5931	5.0	2		4	40A	8	7258	6.3	4		2	30A	5
5931	5.0	2		6	40A	8	7258	6.3	4		8	30A	5
5932	6.3	2		5	30A	7	8016	1.4	2	1, 3, 5, 8	T.C.s	50A	7
5933	6.3	1		3	30A	5	9001	6.3	3	7	1	30A	4
5963	12.6	4	9	2	30A	5	9002	6.3	3		6	30A	4
5963	12.6	4	9	2	30A	5	9003	6.3	3	2	1	30A	4
5964	6.3	3		5	30A	4	9006	6.3	3	1, 2	5	100B	4
5964	6.3	3		6	30A	4							
5998	6.3	7		1	30A	8							
5998	6.3	7		4	30A	8							
6005	6.3	3	7	1	30A	4							
6021	6.3	3		2	30A	6							
6021	6.3	3		7	30A	6							
6072	12.6	4	9	2	30A	5							
6072	12.6	4	9	2	30A	5							
6080	6.3	7		1	30A	8							
6080	6.3	7		4	30A	8							
6082	25	7		1	30A	8							
6082	25	7		4	30A	8							
6087	5.0	2		4	40A	8							
6087	5.0	2		6	40A	8							
6111	6.3	3		2	30A	6							
6111	6.3	3		7	30A	6							
6112	6.3	3		2	30A	6							
6112	6.3	3		7	30A	6							
6134	6.3	2		4	30A	7							
6135	6.3	3	1, 2	6	30A	4							
6136	6.3	3		1	30A	4							
6137	6.3	2		4	30A	7							
6201	12.6	4	9	2	30A	5							
6201	12.6	4	9	7	30A	5							
6202	6.3	3		1	30A	4							
6202	6.3	3		6	30A	4							
6203	6.3	4		1	30A	5							
6203	6.3	4		9	30A	5							
6211	12.6	4	9	2	30A	5							
6211	12.6	4	9	7	30A	5							
6216	6.3	4	6, 8	2	30A	5							
6265	6.3	3		1	30A	5							
6267	6.3	4	6	9	40A	5							
6386	6.3	1		7	30A	9							
6386	6.3	1		3	30A	9							
6417	12.6	4	9	8	30A	5							
6463	12.6	4	9	3	30A	5							
6463	12.6	4	9	8	30A	5							
6550	6.3	2		5	25A	7							
6973	6.3	4	1, 3	6	30A	5							
7025	12.6	4	9	2	30A	5							
7025	12.6	4	9	7	30A	5							